

A Rapid Aeroelastic/Aeroservoelastic Modeling, Analysis and Optimization System for Advanced Flight Vehicles, Phase I

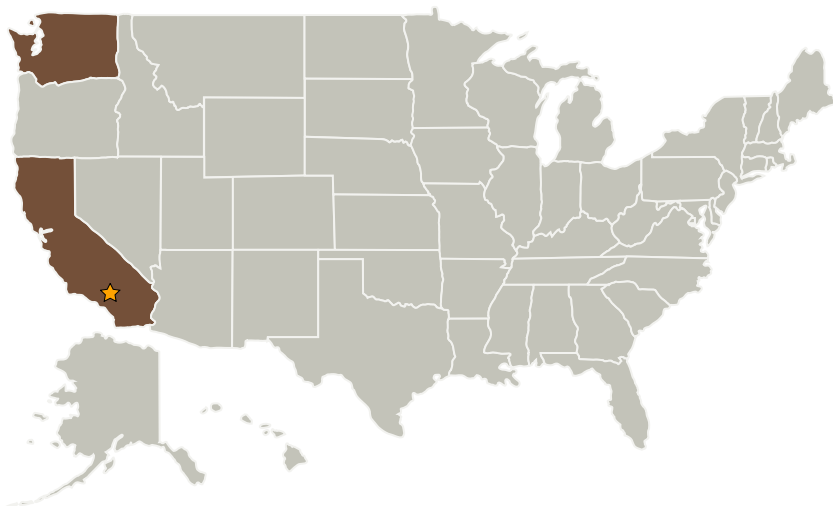
Completed Technology Project (2006 - 2007)



Project Introduction

Stirling Dynamics Inc and the University of Washington propose to develop a MATLAB toolbox for rapid aeroelastic (AE) and aeroservoelastic (ASE) modeling, analysis and optimization of flight vehicles. In practically all current aeroelastic analysis/optimization codes, model generation takes a considerable amount of effort, as does the processing of results. The proposed AE/ASE toolbox will provide user-friendly, mostly GUI-driven capabilities for rapid pre- and post-processing that will considerably decrease model generation effort and analysis/sensitivity cycle time compared to currently available tools. ASE toolbox users will have access to customizable databases containing organizational knowledge and standards for flight vehicle material properties, construction details, actuator/sensor models, airfoil shapes, etc. Model construction will be fully automated, eliminating time-consuming manual pre-processing. A full-range of ASE analyses and design sensitivities will be available within the MATLAB/Simulink environment. Utilities will be developed for importing and exporting computational model data (FEM, CFD, DLM, etc.) and results to and from the major commercial analysis codes. Key innovations include: 1) rapid model development, analysis, and optimization; 2) integration with the widespread and highly accessible MATLAB/Simulink computational environment; and 3) connectivity from MATLAB to more general purpose codes such as NASTRAN for higher fidelity follow-on analyses and model refinement.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Stirling Dynamics, Inc.	Supporting Organization	Industry	Kirkland, Washington

Primary U.S. Work Locations	
California	Washington

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.3 Aeroelasticity